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ABSTRACT

This study evaluated the in-service teacher training program in the Francis Howell R-III Schools, Columbia, Missouri. The program sought to modify the instructional behavior of teachers in the areas of a) increased pupil verbal participation, b) decreased teacher dominance of the verbal classroom environment, c) increased skill and ability to utilize and write student behavioral objectives, d) increased use of higher cognitive levels of questioning, and e) increased openness of teacher/pupil attitude. The following instruments were used in the collection of data: Organizational Climate Description Questionnaire; Process Measure for Teachers, Form A-Pretest, Form B-Posttest; Minnesota Teacher Attitude Inventory; Rokeach's Dogmatism Scale; Process Measure for Students; Program Questionnaire; and Verbal Interactive Behavior Classification System. Analysis of the data revealed the effectiveness of the program in changing the verbal classroom behavior of teacher/pupil, increasing student inquiry effecting the use of higher cognitive levels of questioning by teachers, and developing teacher skill in writing behavioral objectives. (Eight tables of statistical data are included.) (BRB)

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FINAL REPORT

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EVALUATION OF FRANCIS HOWELL R-III SCHOOL DISTRICT TITLE III, ELEMENTARY AND SECONDARY EDUCATION ACT INNOVATIVE PROGRAM

CENTER FOR EDUCATIONAL IMPROVEMENT
COLLEGE OF EDUCATION
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FRANCIS HOWELL R-III SCHOOLS
TITLE III, ESEA INSERVICE TEACHER TRAINING
PROGRAM EVALUATION

Chapter I

OVERVIEW

INTRODUCTION

Based upon a determined and felt need, the Francis Howell R-III Schools applied to the Missouri State Department of Education for funding under Title III of the Elementary and Secondary Education Act to conduct an extended inservice training program for their teachers. The proposed inservice training program was funded under the above act by the State Department. Subsequently, the Center for Educational Improvement, the research and development agency of the College of Education, University of Missouri-Columbia, was subcontracted to evaluate the accomplishment of program goals for the inservice training project. Careful consideration was given to the collection and analysis of the evaluation data for this project. The following report constitutes the findings of this investigation.

BACKGROUND INFORMATION

The parents, students, and staff of the Francis Howell R-III School District demonstrated over the past several years an innovative spirit in attacking and solving educational problems. The ungraded concept was being implemented in most of the district's elementary schools. Year-round school was in effect in two schools. Public support of schools has been good, but because of the unavailability of funds it has been impossible to provide an adequate framework for needed improvements in curriculum and instruction. According to their stated rationale in the funded proposal Francis Howell asserted that:

A. A great need exists in the school district to promote student inquiry and reduce "lecture" type teacher methods.

B. Since a rather substantial number of students are not being served properly, it is felt that teachers must be better trained to diagnose learning situations to overcome student problems.

It is critical to Francis Howell R-III School District that an inservice program be implemented around the goals of the project for the following reasons:

A. Under the present year-round school program, teachers are unable to attend regular summer sessions at universities if they are to fulfill the typical contract period with the school district. Therefore, there is a need for a different approach to obtaining advanced training.

B. Because of inadequate time for team planning, teachers are unable to organize the activities to take advantage of individual competencies and interests.

C. Much of the inservice training which is available for teachers is too general in nature to be of real value in bringing about an observable change in the teacher's classroom behavior. This training needs to be individualized for the teachers involved, and relevant to the specific needs of the school and students which are served. Teachers should be able to make a direct application of the ideas presented in their inservice training programs in a typical classroom situation. They should have the opportunity for trial, evaluation, revision and trying again. This approach to graduate teacher education is needed to bridge the gap between the ideals professed by educational researchers and the realities of the classroom.

D. It is our belief that we can no longer afford to give just lip service to individualizing instruction. However, to make this a reality, teachers must re-orient their thinking and focus on the individual, objectives must be different for different students, instructional materials must be organized to permit individual students to proceed at different rates, and diagnostic-evaluative procedures must be improved.

Numerous district parents indicated in conversations with principals a feeling that many teachers were inadequately trained in meeting certain individual student needs.

Committees of district P. T. A. organizations evidenced their awareness of this need through in-depth discussions with administrators concerning the lack of individual teaching and understanding on the part of the staff in general regarding diagnostic approaches to student learning difficulties.

Parental comments from those schools in the district where continuous progress plans have been implemented indicated great satisfaction. Since ungrading is a step toward achieving the objectives of this project, it can be deducted that parental support of this project will be similarly obvious.

Purposes of the Proposed Project

This project is designed to provide the equipment, materials, consultant services, and time for teachers to improve their abilities "to promote student inquiry, to more effectively diagnose the learning needs of students, and to prescribe more appropriate instructional modes and materials for individual needs."

Objectives, Activities, and Evaluation Procedures

A. To promote student inquiry teachers will:

1. Objective

Decrease the percentage of time dominated by "teacher talk" during class discussions.

Activities

Teachers will complete Mini-Course I, "Effective Questioning," in which they will participate in microteaching sessions focused on increasing student involvement in discussions. In addition, Flanders' "Interaction Analysis" will be used.

Evaluation

Videotape recordings will be made of class discussions before and after the training program. Comparisons will be made to determine if the objective was achieved.

2. Objective

Increase the percentage of questions calling for "higher cognitive responses" from students.

Activities

Mini-Course I is also designed to achieve this objective. Other resources for teachers: Bloom's "Taxonomy of Educational Objectives" and Sanders' "Classroom Questions—What Kinds?"

Evaluation

Videotape recordings of class discussions will be made before and after the training program. Comparisons will be made to determine if the objective was achieved.

3. Objectives

Develop and demonstrate competence in at least six of the following inquiry processes: observing, classifying, measuring, inferring, predicting, formulating hypotheses, controlling variables, interpreting data, and formulating models.

Activities

Teachers will perform the activities designated for the selected processes in the AAAS - "Commentary for Teachers," participate in group activities carried out by consultants, and work with inquiry oriented curriculum materials in their own classrooms (ESS and AAAS, science; and "Man: A Course of Study" and "Concepts and Inquiry," social studies).

Evaluation

AAAS - "Process Measure for Teachers," Forms A & B used as a pretest and posttest.

B. To improve their diagnostic and prescriptive abilities teachers will:

1. Objective

Develop competence in writing behavioral objectives and organizing them into a sequence of increasing difficulty.

Activities

Teachers will study and participate in activities using the following: AAAS - "Guide for Inservice Training," section on Behavioral Objectives and Action Words; VIMCET Association filmstrips and tapes on Objectives; Behavioral Objectives collections from Westinghouse Learning Corporation, and I.O.X.; Preparing Instructional Objectives by Mager; and Developing and Writing Behavioral Objectives, Educational Innovators Press.

Evaluation

Teachers will write a sequence of ten objectives in a subject area of their choice before and after the training program. An independent evaluator will determine if the objectives include the components necessary to effectively describe the desired student behavior (e.g., the desired performance, conditions, and extent). Comparisons will be made (pre and post) to determine teacher improvement.

2. Objective

When given a sequence of ten behavioral objectives the teachers will be able to determine students' level of performance.

Activities

Teachers will study and utilize the following: Prescriptive Math Inventory, McGraw Hill; Croft Inservice Reading Program; AAAS, Science Process Measure; Barnell Toft's Specific Skill Series in Reading.

Evaluation

Teachers will be required to determine students' level of competence in a specified sequence of behavioral objectives. The teacher's diagnoses will be analyzed by an independent evaluator to determine validity.

STATEMENT OF THE PROBLEM

Education and its general support, the public, can ill afford educational programs that slide off into limbo leaving no known tangible results. Thus, the central problem for this evaluation was to identify, document, and analyze the data from the Title III, ESEA inservice training program in an attempt to determine the level of attainment for each of the stated objectives for this program. Simplistically, the problem is one of establishing accountability for the program.

STATEMENT OF THE PURPOSE

It was the purpose of this evaluation to provide empirical evidence pertaining to the success and/or failure of the inservice training. Feedback based upon demonstrable accomplishment provides information and insights into quality control needs for improving present and/or future programs of this nature.

LIMITATIONS

The results of this study are limited to the Francis Howell R-III Schools and to the individual participating teachers. No attempt was made to generalize the findings of this study to other organizations, institutions, or populations. The study is further limited in that data were not collected from nonparticipating teachers for control purposes.

EVALUATION HYPOTHESIS

It was assumed by this project that a higher quality of instruction would result if the instructional behavior of teachers could be modified. Behavior modification was sought through inservice training in the areas of (1) increased pupil verbal participation, (2) decreased teacher dominance of the verbal classroom environment, (3) an increase in the skill and ability to utilize and

write student behavioral objectives, (4) an increase in the use of higher cognitive levels of questioning, and (5) an increase in the openness of teacher and pupil attitude. The general hypothesis being tested in this study was that the planned teacher inservice training program would produce measurable changes in the behaviors described above. If significant behavioral changes could be observed, it would provide some evidence of causality and, thus, effectiveness of the training program.

THE STATISTICAL HYPOTHESES

Growing out of the general evaluation hypotheses, eleven statistical hypotheses were generated as follows.

1. There will be no significant mean differences observed between the pre and posttest mean scores in the degree of student participation, as measured by the VIB classification system.
2. There will be no significant mean differences observed between the pre and posttest mean scores in the frequency of speaker change, as measured by the VIB classification system.

3. There will be no significant mean differences observed between the pre and posttest mean scores in the frequency of encouragement, as measured by the VIB classification system.
4. There will be no significant mean differences observed between the pre and posttest mean scores as to the degree to which the teacher dominated the discussion, as measured by the VIB classification system.
5. There will be no significant mean differences observed between the pre and posttest mean scores in the effectiveness of teacher talk to stimulate student talk, as measured by the VIB classification system.
6. There will be no significant mean differences observed in the mean scores of the pre and posttest scores for the variable of perception of the school's organizational climate, as measured by the Organizational Climate Description Questionnaire.
7. There will be no significant mean differences observed in the mean scores of the pre and posttest scores groups for the variable of teachers' dogmatism, as measured by Rokeach's Dogmatism Scale.

8. There will be no significant mean differences observed in the mean scores of the pre and posttest mean scores for the variables of teachers' attitudes toward teaching, as measured by the Minnesota Teacher Attitude Inventory.

9. There will be no significant mean differences in the mean scores of the pre and posttest scores for the variable of attitudes toward inservice programs, as measured by the Program Questionnaire.

10. There will be no significant mean differences in the mean scores of the pre and posttest frequency scores for the variable of levels of questioning, as measured by the Levels of Questioning.[1]

11. There will be no significant mean differences in the mean scores of the pre and posttest scores for the variable of writing behavioral objectives, as measured by Mager's Behavioral Objective Criteria.[2]

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[1] Center for Educational Improvement, Levels of Questioning (Columbia: University of Missouri, College of Education, no date), mimeographed.

[2] Robert F. Mager, Preparing Instructional Objectives (Palo Alto, California: Fearon Publishers, 1962).

SUMMARY

In attempting to determine the viability of the Francis Howell R-III teacher inservice training project, eleven statistical hypotheses were tested. The eleven tested hypotheses were directly associated with the training objectives and/or outcomes stated for the Title III, ESEA training project.

Chapter II

EVALUATION PROCEDURES

EVALUATION DESIGN

Control of confounding and intervening variables was rendered nearly impossible due to administrative necessities required to implement the inservice teacher training program. Participating teachers in the inservice training were not randomly selected and in most cases were volunteers. This fact made it impossible to establish a second homogeneous group of teachers for control purposes.

For the reasons previously identified, the design selected for the evaluation was of a quasi experimental nature. The design consisted of pre-instruction and post-instruction testing of eleven teacher behaviors and attitudes.

The mean behavioral and attitudinal change exhibited by the teachers from pre to posttest was calculated for each of the eleven variables and treated statistically. The .05 level of confidence was used as the significance criterion.

THE TREATMENT PROCEDURES

A comprehensive inservice training program was designed and presented on a regular basis to the participating teachers throughout the 1971-72 year. Training components were implemented in the eleven teacher behavioral and attitudinal areas with which this study was concerned. A thumbnail sketch of the treatment activities is presented in Chapter I of this report. Detailed explanations of the treatment procedures for this inservice training program may be found in the project proposal which is on file at the school district offices and the Missouri State Department of Education.

COLLECTION OF THE DATA

Data for this study were obtained from pre and posttests given to each of the participating teachers. Verbal Classroom data were obtained from audio taped observations that were recorded on cassette tape for each teacher experiencing training.

The posttests were administered to the teachers in May, 1972. The pretest was given in conjunction with and/or before the first workshops in the inservice teacher training program. A twenty minute audio recorded segment of classroom interaction for each of the teachers was obtained during the last week of April, 1972 and the first week of May, 1972.

COLLECTION OF INTERACTION DATA

Cassette tape recorders were provided for each teacher for purposes of audio tape recording an observation of their classes' verbal behavior twenty minutes in length. This observation was coded utilizing the VIB analysis instrument. The coding was done by trained coders whose inter-coder reliability was at least 0.85. Consistent with the accepted use of the VIB system, the classroom interaction was codified each three seconds and/or each category change.

Optical scan sheets containing the coded classroom interaction were processed and fed into a computer which produced printouts of completed 11 x 11 matrix and indices.

To express the various qualities of the classroom verbal interactive behavior in a quantitative way, the tally totals of selected matrix areas were combined and compared with the total number of observations so that the value of the resulting ratio reflected the following indices.

Index 1: The Degree of Student Participation

Index 2: The Frequency of Speaker Change

Index 3: The Frequency of Encouragement

Index 4: The Degree to Which the Teacher Dominated the Discussion

Index 5: The Effectiveness of Teacher Talk to Stimulate Student Talk[1]

MEASURING THE ATTAINMENT OF STATED PROJECT OBJECTIVES

The evaluation scheme utilized was designed to insure that data were collected and analyzed pertinent to each of the project objectives. This evaluation scheme is presented in Appendix A of this report.

ANALYSIS OF THE DATA

Collected data of this investigation are presented in one or more of the following forms: (1) narrative; (2) tabular; (3) graphical.

A profile of the data collected for each of the participating teachers is presented illustrating: (1) the grade level at which they are presently teaching and the number of years experience that they have in the teaching profession; (2) the mean scores for the experimental group on the following measures:

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[1] Center for Educational Improvement, "A Proposed Technique for Generalizing VIB Matrix Results" (Columbia, Missouri: University of Missouri-Columbia, College of Education, not dated). Mimeographed.

(a) Verbal Interactive Behavior (VIB)

(1) Teacher dominance index

(2) Student participating index

(3) Teacher encouragement index

(4) Frequency of speaker change index

(5) Student inquiry index

(b) Organizational Climate Description Questionnaire

(c) Program Questionnaire

(d) Minnesota Teacher Attitude Inventory

(e) Rokeach Dogmatism Scale

(f) Levels of Questioning

(g) Mager's Behavioral Objectives

Graphical and tabular data are presented to illustrate the difference in means between the pre and posttest scores for each of the instruments used in this study.

Determination of the significance of mean differences between the pre-instruction scores and post-instruction scores are of major concern to this study. The statistical significance of this difference in group gain was determined by employing the "t" test for parametric data and the Mann Whitney U test for nonparametric data. Hypotheses were tested using the .05 level of

confidence.

THE INSTRUMENTS

Testing for this research was accomplished by the administration of the following instruments.

1. Organizational Climate Description Questionnaire (OCDQ)
2. Process Measure for Teachers, Form A-Pretest, Form B-Posttest.
3. Minnesota Teacher Attitude Inventory (MTAI)
4. Rokeach's Dogmatism Scale
5. Process Measure for Students
6. Program Questionnaire
7. Verbal Interactive Behavior Classification System (VIB)

The Organizational Climate Description Questionnaire (OCDQ) contains sixty-four Likert-type items. Halpin and Croft believed three major contributions have been made by their research on Organizational Climates. They described these contributions as follows:

1. We have developed an instrument, the Organizational Climate Description Questionnaire, which can facilitate research on organizational climates, whether in schools or in other types of organizations.
2. We have devised a way of conceptualizing six major types of organizational climates and have identified three profile factors which can prove useful in subsequent research on leadership and organizational

behavior.

3. We have noted the pivotal importance of the concept of "authenticity" in behavior and have suggested that future research in the OCDQ be conjoined with a set of parallel research projects in the problem of "authenticity."[4]

The six distinct types of organizational climate profiles that were devised by Halpin and Croft range on the continuum from "open" through "autonomous," "controlled," "familiar," and "paternal." The OCDQ describes the school climate in terms of the perceptions of its staff regarding the school's adaptability to change.[5]

Cook, et al., state that the Minnesota Teacher Attitude Inventory (MTAI) was "designed to measure those attitudes of a teacher which predict how well he will get along with pupils in interpersonal relationships and indirectly how well satisfied he will be with teaching as a vocation."[6] For purposes of this investigation, the

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[4]Andrew Halpin and Don Croft, "The Organizational Climate of Schools, 'Administrator's Notebook'," Vol. II (March, 1963), p. 1.

[5]Andrew Halpin, Theory and Research in Administration (New York: The Macmillan Company, 1966), p. 135.

[6]Walter W. Cook, et al., Minnesota Teacher Attitude Inventory (New York: The Psychological Corporation, no date), p. 3.

MTAI was used to assess the differences in the attitudes toward teaching held by the experimental group. The instrument contains 150 items which have been shown to be both valid and reliable.[7]

Form E of Rokeach's Dogmatism Scale has as its primary purpose the measurement of individual differences in openness or closedness of belief systems.[8] The author suggests that the basic characteristic that defines the extent to which a person's system is open or closed would be the extent to which the person can receive, evaluate, and act on relevant information received from outside on its own intrinsic rewards. These are not hindered by unimportant factors in the situation arising from within the person or from the outside.[9]

The Dogmatism Scale, as designed by Rokeach, has been through five editions which were all aimed to increase the scale's

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[7]Ibid., pp. 10-14.

[8]Milton Rokeach, The Open and Closed Mind (New York: Basic Books, Inc., 1960), p. 71.

[9]Ibid., p. 57.

reliability. The author reported that for Form E of the scale, the reliability ranged from 0.68 to 0.93 for different groups of subjects.[10]

Form E contains 40 items whose responses are arranged on a continuum from strong agreement to strong disagreement. A subject is required to respond to each item on a scale ranging from -3 to +3, with the 0 point excluded in order to force responses toward disagreement or agreement. For scoring purposes, the scale is converted to a 1-to-7 scale by adding a constant of 4 to each score.

The Program Questionnaire was designed by staff members of the Center for Educational Improvement to measure teachers' attitudes toward inservice training programs. The questionnaire contains fifteen items for which the subject is asked to respond on a five point form of the Likert-type scale ranging from "very much" to "very little." A sixth category "no idea" is included for subjects who have no idea or feeling about a question. The Program Questionnaire has not been tested for reliability because of its short length.

INTERACTION ANALYSIS INSTRUMENT

The verbal communication behavior was analyzed through the utilization of the Verbal Interactive Behavior (VIB) classification

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[10] Ibid., p. 96.

system.[11] Paden[12] has found the VIB instrument to have an inter-coder reliability of 0.92. The VIB system is concerned with the verbal behavior as it occurs in the classroom. All classroom interaction can be coded into one of the mutually exclusive VIB classifications. The VIB system contains eleven classifications (see Appendix A) which identifies all classroom behavior into one of four major divisions: (1) teacher talk, (2) student talk, (3) silence, and (4) confusion.

The division of teacher talk can be further divided into verbal behavior that fosters inquiry and verbal behavior that hinders inquiry. Teacher talk categories that foster inquiry are: (a) using student ideas, (b) positive reinforcement, (c) teacher question. Teacher talk categories that hinder inquiry are: (a) teacher lecture, (b) directing students, and (c) negative reinforcement.

The three categories included under the division of student talk are: (a) student initiation, (b) student question, and (c) student response. All three are considered desirable classroom

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[11] Center for Educational Improvement, Instructional Behavior and Skills Development: Improving Instruction Through Experientially Based Inservice Education (Columbia: College of Education, University of Missouri-Columbia, 1969), p. 2.

[12] Jon S. Paden, "Testing the VIB Instrument" (Columbia: Center for Educational Improvement, University of Missouri, College of Education, not dated). Mimeographed.

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behaviors, but student initiated response is the goal of "inquiry teaching."[13]

The third division is classroom silence which contains one category—silence. The fourth general division is classroom confusion, which also contains one category which is labeled "confusion." Appendix A contains a summary of these categories.

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[13]Center for Educational Improvement, op. cit., p 34.

Chapter III

ANALYSIS OF THE DATA

If, in fact, the inservice teacher training program had any effect upon the behavior and attitudes of participating teachers, that force would manifest itself in the data collected pertinent to the eleven hypotheses postulated for this investigation. This chapter presents an analytical review of the data collected for this evaluation study.

TEACHER AND STUDENT VERBAL CLASSROOM BEHAVIOR

Twenty-nine of the participating teachers provided audio-taped records of their classroom instruction prior to initiating their training program and again at the close of training. Each period of taped classroom instruction was of 20 minutes duration.

The fifty-eight tapes of classroom instruction were codified by a staff of experienced and trained coders using the Verbal Interactive Behavior (VIB) system for classifying classroom behavior. The coders have a demonstrated intercoder reliability of .85 or better, which meets or exceeds research criterion.

VIB classifies verbal classroom behavior into eleven classifications. The observed classroom behavior data of the 29

participating teachers on the pre and post measures are presented in Table 1.

Table 1

Pre and Post Measures of Verbal Classroom Behavior Distributed by Behavioral Classification

Behavior Classification	Pre and Post Frequency Means		Pre and Post Per cent of Total Classroom Time	
	Pre	Post	Pre	Post
1. Student Initiation	21.38	16.76	4.84	5.53
2. Student Questions	3.17	1.69	.74	.51
3. Student Response	118.48	107.90	29.40	40.67
4. Positive Reinforcement	50.41	30.76	11.41	11.40
5. Using Student Ideas	3.86	5.93	1.12	1.47
6. Teacher Questions	123.38	68.79	23.36	25.50
7. Teacher Lecture	72.62	19.07	15.42	6.41
8. Directing Students	22.86	1.55	4.24	.60
9. Negative Reinforcement	6.24	1.62	1.39	.56
10. Silence	29.86	18.52	6.36	7.12
11. Confusion	5.34	.41	.89	.19

The most meaningful information contained in Table , for the general reader, are the pre and post per cent of total classroom time columns. These data represent the observed per cent of time spent in the two observed classes in each of the behavior classifications. In comparing the pre and post per cent columns, generalization can be made about the change in frequency of observed behavior. For example, Teacher Lecture, classification 7, decreased from pre to posttest from 15.42% of total time to 6.41% of total time. This means that the

twenty-nine observed teachers spent 9.01% less of their time lecturing to the students after they had received inservice training than they did prior to training. Additionally, at the close of inservice training, less classroom time was devoted to directing student behavior, giving students negative reinforcement, and confusion. A corresponding increase was observed in the amount of student initiation, student response, using student ideas and teacher questions.

Mathematical manipulation of the total classroom behavior data provides useful indices of five specific types of behavior: (1) student participation, (2) frequency of speaker change, (3) encouragement of students, (4) teacher domination, and (5) effectiveness of teacher talk to increase student talk. Data are presented in Table 2 for each of the five indices for both the pre-inservice training classroom observation and the post-inservice training classroom observation.

Statistical treatment of the data contained in Table 2 was accomplished to test the first five null hypotheses that were established for this evaluation study. The pre and post index scores for each of the observed indices of behavior were tested for significant differences using the nonparametric Mann Whitney U test. The results of this testing are contained in Table 3.

Table 2

Pre- and Post-Inservice Training Indices of Classroom Verbal Behavior

Observed Behavior	Pre-Inservice Training Index	Post-Inservice Training Index
1. Student Participation	.35	.46
2. Frequency of Speaker Change	.41	.37
3. Encouragement of Students	.65	.85
4. Teacher Domination	.57	.45
5. Effectiveness of Teacher Talk	.37	.43

Table 3

Significance of Change From Pre-Training to Post-Training in the Five VIB Behavior Indices

Observed Behavior	No. of Teachers	Pre-Index	Post-Index	Mann Whitney U Value	Z Value	Significance at .05 level
1. Student Participation	29	.35	.47	221.00	-3.10	sign.
2. Frequency of Speaker Change	29	.41	.37	379.50	- .64	not sign.
3. Encouragement of Students	29	.65	.85	202.00	-3.40	sign.
4. Teacher Domination	29	.57	.45	146.00	-4.27	sign.
5. Effect of Teacher Talk	29	.37	.43	298.00	-1.91	sign.

All of the observed behaviors, except the frequency of speaker change, as reported in Table 3, changed significantly from the pre-inservice training observation to the post-inservice training observation.

ORGANIZATIONAL CLIMATE

Pre- and post-inservice training data were collected from the participating teachers relative to their individual perceptions of the organizational climates of their respective schools. Visual analysis of these data indicated no difference in the perceived climates of the schools in question. Since no differences were readily observable, these data were not subjected to statistical analysis. The OCDQ scores are attached as an addendum to this report.

TEACHER DOGMATISM

Dogmatism data were collected by administration of the Rokeach Dogmatism Scale to the participating teachers prior to initiation of inservice training and again at the close of training. The difference between pre and post training dogmatism mean scores was tested statistically by employing the basic t test of mean difference for homogeneous groups. The results of this test and other pertinent data are reported in Table 4.

Table 4

Significance of Change from Pre-Training to Post-Training in Teacher Dogmatism Mean Scores

N	Pre-Training Mean Score	Post-Training Mean Score	t Value	Significance at .05 Level
41	141.73	122.95	3.551	significant

Data in Table 4 show that the participating teachers as a group were less dogmatic at the close of training than they were prior to training.

TEACHER ATTITUDE

Two types of teacher attitudes were measured for this evaluation study. The first, general teacher attitude, was measured both prior to and after inservice training of the participating teachers by administering the Minnesota Teacher Attitude Inventory (MTAI). The second, teacher attitude toward inservice training, was measured before and after training by administering the Center for Educational Improvement Program Questionnaire (CEIPQ).

Data collected by the MTAI are presented in Table 5.

Table 5

Significance of Change from Pre-Training to Post-Training in General Teacher Attitude Measured by MTAI

N	Pre-Training Mean Score	Post-Training Mean Score	t Value	Significance at .05 Level
41	38.83	30.32	-2.362	significant

The change in general teacher attitude as measured by MTAI did change significantly; however, the change was not in the desired direction.

Data pertinent to teacher attitude concerning inservice training are presented in Table 6.

Table 6

Significance of Change from Pre-Training to Post-Training in Teacher Attitude Towards Inservice Training Measured by CEIPQ

N	Pre-Training Mean Score	Post-Training Mean Score	t Value	Significance at .05 Level
42	78.13	89.76	2.09	significant

The attitude of the participating teachers as a group changed significantly in a positive direction. That is to say, as a group, the teachers felt more favorably toward inservice training at the close of

their experience than they were previous to their training program.

TEACHER QUESTIONING TECHNIQUE

After completing the codification of verbal classroom behavior observed on the pre and post training audio-taped instructional periods of 29 participating teachers, the tapes were reviewed again to classify the types of teacher questions used during instruction. One trained and experienced question codifier was used to collect these data which eliminated the problem of inter-coder reliability.

The questions were noted from the audio tapes and a typescript made of each. The identified questions were then placed into one of four categories or types of questions as described by the Center for Educational Improvement.[1]

CEI's Levels of Questioning are as follows: (1) Factual or knowledge level questions, (2) description or comprehension level questions, (3) explanatory or synthesis level questions, and (4) evaluation level questions. These levels of questions are considered to be in a hierarchy of difficulty, process-wise. That is to say, a

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[1] Center for Educational Improvement, Levels of Questioning (Columbia: University of Missouri, College of Education, not dated), mimeographed.

level 4 question is usually a more desirable questioning technique than either of the other three levels.

Levels of teacher question data are presented in Table 7.

Table 7

Significance of Change From Pre-Training to Post-Training in Teacher Use of CEI's Four Levels of Questions

Level of Question	No. of Teachers	Pre-Training Mean Freq.	Post-Training Mean Freq.	t Value	Significance at .05 level
1. Factual	29	69.400	56.610	2.256	significant
2. Description	29	11.918	19.780	2.144	significant
3. Explanation	29	12.421	16.100	1.378	not signifi.
4. Evaluation	29	5.532	7.492	.761	not signifi.

Data in Table 7 show that the use of factual type questions by the 29 teachers decreased significantly from pre- to post-inservice training. Further, the use of descriptive level questions increased significantly over the same time span. While the use of both explanation and evaluation level questions increased, the magnitude of change was not large enough to be statistically significant.

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TEACHER SKILL IN WRITING BEHAVIORAL OBJECTIVES

Prior to commencement of inservice training on behavioral objectives, ten teachers were instructed to write ten behaviorally stated objectives. The teachers complied with these instructions and this information became the baseline data for determining change in teacher's skill for writing behavioral objectives. At the termination of inservice training, the same ten teachers provided the evaluators with a second set of ten behaviorally stated objectives.

Mager's[2] four essential criteria of a good behavioral objective were used as the standards to judge the twenty sets of teacher prepared behavioral objectives. The four criteria are as follows: (1) The terminal learner behavior must be specifically stated; (2) the specific learning activity and/or performance of the learner must be clearly identified; (3) the criterion level must be determined and shown, and (4) the specific level of learner achievement must be stated.

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[2]Robert F. Mager, Preparing Instructional Objectives (Palo Alto, California: Fearon Publishers, 1962).

Using these four criteria as the standards, a perfect score for the ten behaviorally stated objectives would be 40. The pre and post-inservice training scores for each teacher and the total group mean score and per cent are presented in Table 8.

Table 8

Pre- and Post-Inservice Training Scores of Behavioral Objective Writing Skills by Teacher

Teacher Number	Pre-Inservice Training Score	Post-Inservice Training Score	Pre-Inservice Training %	Post-Inservice Training %
1	9	36	32%	90%
2	16	31	40%	78%
3	17	30	71%	75%
4	16	40	40%	100%
5	18	40	45%	100%
6	2	25	5%	63%
7	0	25	0%	63%
8	1	34	3%	85%
9	4	32	10%	80%
10	40	24	100%	60%
Mean Scores	12.3	31.7	30%	79%

Statistical testing for difference between the preservice training behavioral objective mean score of 12.3 and the post-inservice training behavioral objective mean score of 31.7 demonstrated significant difference at the .05 level of confidence.

SUMMARY

The data as presented and analyzed in this chapter provided the foundation for the evaluation findings and conclusions presented in the last chapter.

Chapter IV

EVALUATION FINDINGS AND CONCLUSIONS

Observing and determining the magnitude of behavior and attitude change of the teachers participating in the Francis Howell R-III School District Title III, ESEA Inservice Training Program were the central focus of this evaluation. To accomplish the evaluation mission, several types of teacher behavior and attitude data were systematically collected, analyzed, and presented in this report. The following findings and conclusions are based upon the total data collected for this evaluation effort.

FINDINGS

Eleven hypotheses were generated for this investigation. The findings associated with each of the eleven tested hypotheses are presented first.

1. Student Participation increased significantly in frequency in the observed classroom situation after the participating teachers completed their inservice training. The null hypothesis of no difference was rejected.

2. Post-inservice training observation of classroom behavior found no change in frequency of speaker change from the pre-inservice training observation. Therefore, the null hypothesis was not rejected.
3. After receiving inservice training, the participating teachers verbally encouraged their respective students significantly more frequently than was true prior to training. Subsequently, the null hypothesis was rejected.
4. Teacher domination of the classroom learning environment significantly decreased from pre to post-inservice training observation. Thus, the null hypothesis was rejected.
5. Participating teachers effectively manipulated their verbal instructional behavior to significantly increase the amount and frequency of student participation in their respective classrooms. The null hypothesis was rejected.
6. Inservice teachers did not change their perception of the organizational climate of their respective school. The null hypothesis could not be rejected.
7. Dogmatism of the teachers decreased significantly at the close of inservice training when compared to the

first week of training. Thus, the null hypothesis was rejected.

8. General teacher attitude as measured by the MTAI decreased significantly from pre-training to post-training observation. The null hypothesis was rejected. It should be noted that this attitudinal change was not in the desired direction.

9. Teacher attitude towards and about inservice training was significantly more positive at the conclusion of training. The null hypothesis was rejected.

10. Questioning techniques of the teachers became significantly less frequent at the factual level and significantly more frequent at the description level by the end of inservice training. Explanation and evaluation level questions were used more frequently at the close of training; however, the difference in frequency use from pre-training to post-training observation was not statistically significant. The null hypothesis was rejected for factual and description level questioning and was not rejected for explanation and evaluation level questioning.

11. Teacher skill in writing behavioral objectives increased significantly from pre-training to post-training observation. The null hypothesis was rejected.

CONCLUSIONS

The reader is reminded that control group data were not available for this evaluation effort, and that this fact affects to a degree the validity of conclusions drawn from this study. However, there is no reason to assume the findings of this study to be invalid. Measurable behavior and attitude change was found to be statistically significant in most of the vital areas with which this study was concerned.

The Francis Howell R-III School District, Title III, ESEA Inservice Training Program was conceived, funded, and implemented based upon five original program objectives and two addended objectives. The conclusions drawn from this study will be presented in association with the appropriate program objective.

Program Objective I - Effective Questioning

The training program proposed as an objective to increase the effectiveness of teacher classroom questioning. It is reasonable to infer from the findings of this study that the effectiveness of teacher questioning was changed in a positive direction. Higher levels of teacher

questioning were being used significantly more frequently by the teachers at the close of training than was the case prior to training. It, therefore, is reasonable to assume that Program Objective I, effective questioning, was accomplished.

Program Objective II - Student Inquiry Process

A second goal of the inservice training program was to enhance student inquiry. Inquiry as an identifiable behavior is difficult to observe and measure. Many researchers, in fact, believe that inquiry takes place within an individual's mind and, thus, cannot presently be measured. However, certain observable behaviors have been identified that can logically be defended as indicators of inquiry. Some of the accepted classroom indicators of student inquiry are (1) the frequency of initiation of verbal and/or non-verbal activity in the classroom environment by a student; (2) the frequency that students ask questions in the classroom environment; and (3) the frequency of total student participation in the classroom.

Using the three indicators of student inquiry identified above, the findings of this study support the conclusion that student inquiry increased. Data contained in Table 1

of this report show that the student initiation expressed as a per cent of the total classroom interaction increased from pre to post-observation. Finding number one of this report shows that the total student participation in the classroom increased significantly during the training year. Finding number four substantiates the fact that teacher domination of the classroom decreased significantly from pre to post-observation. These three facts provide evidence that the inquiry process was implemented with students and at least basic inroads were made in accomplishing the second program objective.

Program Objective III - Behavioral Objectives

The training project proposed a program to increase the skill of the participating teachers in writing behaviorally stated learning objectives. Finding number eleven provides the evidence that the teachers tested could write significantly better behaviorally stated objectives at the close of training than they could previous to training. The data support the conclusion that Program Objective III was attained.

Program Objective IV - Diagnosis and Prescription

Another desired outcome of the training program was to increase the skill of the participating teachers in the

areas of diagnosing the learning environment and prescribing needed change. This objective was not measured directly by the data collected for this evaluation effort. However, related data were collected from which inference could be made. Finding number five supports the fact that the teachers manipulated their own teacher behavior in such a way as to increase the amount of student participation in their respective classroom environments, a clear example of diagnosis and prescription. Finding number three shows that teachers increased the amount of encouragement given to students. Teachers would not modify their instructional behavior in this manner if it were not for diagnostic and/or prescriptive reasons.

The data, while limited and peripheral, brought to bear on this desired program outcome seems to indicate that some movement was made toward the accomplishment of this objective.

Program Objective V - Teacher Effectiveness Training

Findings one, three, four, and five document the fact that the instructional behavior of the participating teachers was effectively modified. Not only were the behaviors

modified, but they were modified in the appropriate direction. These four instructional behaviors which were modified have long been established by educational research as foundations for teacher effectiveness.

The data support the conclusion that the teachers utilized significantly better instructional behavior at the close of inservice training than they demonstrated prior to training. It, thus, seems reasonable to infer that Program Objective V was met for the most part.

Program Objective III A Addenda - Student Achievement

Student change was measured by this study in the relationship between student interaction and the total classroom learning environment. Findings one and five support the conclusion that students increased significantly the degree of student participation in the classroom learning environment. Based on these findings, it is inferred that the program made some strides toward the accomplishment of this program objective.

Program Objective III B Addenda - Attitudinal Change

It was the stated intent of the inservice training program to effect a positive change in teacher attitude. The findings are mixed and, thus, provide inconclusive

evidence about the attainment of this objective.

Finding number seven provides evidence that teachers were significantly less dogmatic after training. Finding number nine shows that teacher attitude became more positive about inservice training. On the other side of the coin, finding six shows that teachers' attitudes toward organizational climate didn't change. A caution should be observed in interpreting this climate finding. It may be that the teacher attitude about climate didn't change because the climate of the organization didn't change. Finding number eight shows that the general attitude of the teachers changed in a negative direction.

It was concluded from this evidence that teacher attitude was changed while the observed change was not always in the desired direction.

SUMMARY

In summarizing the findings and conclusions of this evaluation study, it seems reasonable to state that the data support the general conclusion that (A) Program Objective I - Effective Questioning, II - Student Inquiry, and III - Behavioral Objectives, were attained; (B) Program Objective IV - Diagnosis and Prescription, V - Teacher Effectiveness Training, and III A Addenda - Student

Achievement were not completely accomplished; however, inroads were made toward their attainment; and (C) Program Objective III B Addenda - Attitudinal Change was effected, however, not always in the desired direction.

Without question, the strengths of the teacher inservice training program identified by the data collected for this study were the effectiveness of training to (1) change the verbal classroom behavior of teacher and students in a desired direction, (2) increase the incidence of student inquiry indicators in the classroom,(3) effect the use of higher levels of questioning by teachers, and (4) develop teacher skill in writing behavioral objectives.

It is the opinion of this evaluation team that this inservice training program had a significantly positive effect upon the learning environment of all those students, teachers, and administrators involved.

APPENDIX A

Collection of the Data

Data from this study will be obtained from the pre and posttests given to each member of the experimental groups. Data will also be obtained from the audio tape observations that will be recorded on cassette tape for each member of the experimental groups.

The posttests will be administered to the experimental groups in May, 1972. The pretest for the experimental group should be given in conjunction with and/or before the first workshops in the in-service Teacher Training program. A twenty-minute audio recorded segment of each of the teachers in the experimental groups will be obtained during the last week of April, 1972 and the first week of May, 1972.

The Statistical Hypotheses

The following statistical hypotheses will be tested in this study:

1. There will be no significant mean differences observed between the pre and posttest mean scores in the degree of student participation, as measured by the VIB classification system.
2. There will be no significant mean differences observed between the pre and posttest mean scores in the frequency of speaker change, as measured by the VIB classification system.
3. There will be no significant mean differences observed between the pre and posttest mean scores in the frequency of encouragement, as measured by the VIB classification system.
4. There will be no significant mean differences observed between the pre and posttest mean scores as to the degree to which the

teacher dominated the discussion, as measured by the VIB classification system.

5. There will be no significant mean differences observed between the pre and posttest mean scores in the effectiveness of teacher talk to stimulate student talk, as measured by the VIB classification system.
6. There will be no significant mean differences observed in the mean scores of the pre and posttest scores for the variable of perception of the school's organizational climate, as measured by the Organizational Climate Description Questionnaire.
7. There will be no significant mean differences observed in the mean scores of the pre and posttest mean scores groups for the variable of teachers' dogmatism, as measured by Rokeach's Dogmatism Scale.
8. There will be no significant mean differences observed in the mean scores of the pre and posttest mean scores for the variables of teachers' attitudes toward teaching, as measured by the Minnesota Teacher Attitude Inventory.
9. There will be no significant mean differences in the mean scores of the pre and posttest scores for the variable of attitudes toward in-service programs, as measured by the Program Questionnaire.

Analysis of the Data

Collected data of this investigation will be presented in one or more of the following forms: (1) narrative; (2) tabular; (3) graphical.

A profile of the data collected for each of the participating teachers will be presented illustrating: (1) the grade level at which they are presently teaching and the number of years experience that they have in

the teaching profession; (2) the mean scores for the experimental and control groups on the following measures:

(a) Verbal Interactive Behavior (VIB)

(1) Teacher dominance index

(2) Student participation index

(3) Teacher encouragement index

(4) Frequency of speaker change index

(5) Student inquiry index

(b) Organizational Climate Description Questionnaire

(c) Program Questionnaire

(3) the mean, standard deviation, Σx, Σx^2 for each instrument mentioned above.

Graphical and tabular data will be presented to illustrate the difference in means between the pre and posttest scores for each of the instruments used in this study.

Determination of the significance of mean differences between the pre-instruction scores and post-instruction scores will be of major concern to this study. The statistical significance of this difference in group gain will be determined by employing the "t" test. Hypotheses will be tested using the .05 level of confidence.

Objectives	General Program Evaluation	Specific Workshop Evaluation	Activity
I. Inquiry Process	Pre- and post-workshop recordings of classroom discussion will be collected. Analysis of tapes will include: Index 5-effectiveness of teacher talk to stimulate student talk; Index 4-teacher dominance; Index 1-degree of student participation, T-test or Mann-Whitney U-test of significance will be used.	Weekly analysis of classroom interaction (5-10 minute sample). Progressive listing of each teacher's class interaction via Indices 1, 4, and 5. This will enable the workshop personnel to determine if change is taking place in classroom interaction.	Utilization of audio tape recorder rather than video-tape recorder to record class discussion for analysis.
I. Effective Questioning	Pre- and post-workshop recordings will be collected. From these recordings the questions in the interaction will be classified into the four categories. The total number of questions in each category will be transformed into a ratio. The category ratios will be compared by a T-test or Mann-Whitney U-test of significance.	Levels of questioning will be recorded during microteaching sessions. Comparison of ratios of questions in each category will be made with earlier teaching segments ratios to determine direction of change.	-Levels of questioning unit. -Microteaching unit.
III. Behavioral Objectives	Pre-post treatment examination: (a) identify "goal" behavioral objectives; (b) writing behavioral objectives. Independent evaluator will compare objectives for change.	(1) Comparison of actual classroom objectives of teachers from a period prior to and after the sessions on behavioral objectives (based upon Mager's criteria of behavioral objectives. (2) Comparison of teacher-made unit test for students with the stated objectives. This comparison should be made upon both pre-and post-treatment units. (3) Student attitudes about clarity and relatedness of objectives to unit tests made by teacher.	I. B. S. unit on objectives.

V. Diagnosis & Prescription	Randomly selected teachers will be requested to demonstrate their diagnostic abilities in pre- and post-treatment situations.	Participants will evaluate hypothetical cases for each instrument by judging the adequacies of students to read certain levels of Bloom's hierarchy. Their diagnosis will be compared with key to instruments.	-Session on Bloom's hierarchy of objectives. -Information on use and interpretation of diagnostic test.
V. Teacher Effectiveness Training	AAAS Process Measure for Teachers Pre- Form A Post- Form B	Lesson evaluations based upon skill acquisition needed.	
Addenda II. A. Cognitive Achievement	Pre-, post-program test instrument used "Process Measure for Students."	Formative, summative, attitudinal tests should be administered while the course is in operation to determine growth of students while program is on going.	
II. B. Attitudinal Change	1. Administration of locally developed instrument to students and teachers (pre-post). 2. Students—Purdue Attitude Scale Toward Teacher, Course. 3. Teachers—M. T. A. I., Rokeach, O. C. D. Q.,	Utilization of monitoring devices (attitudinal tests) while program is on-going.	Session to teachers on construction and use of monitoring devices for class attitude evaluation.